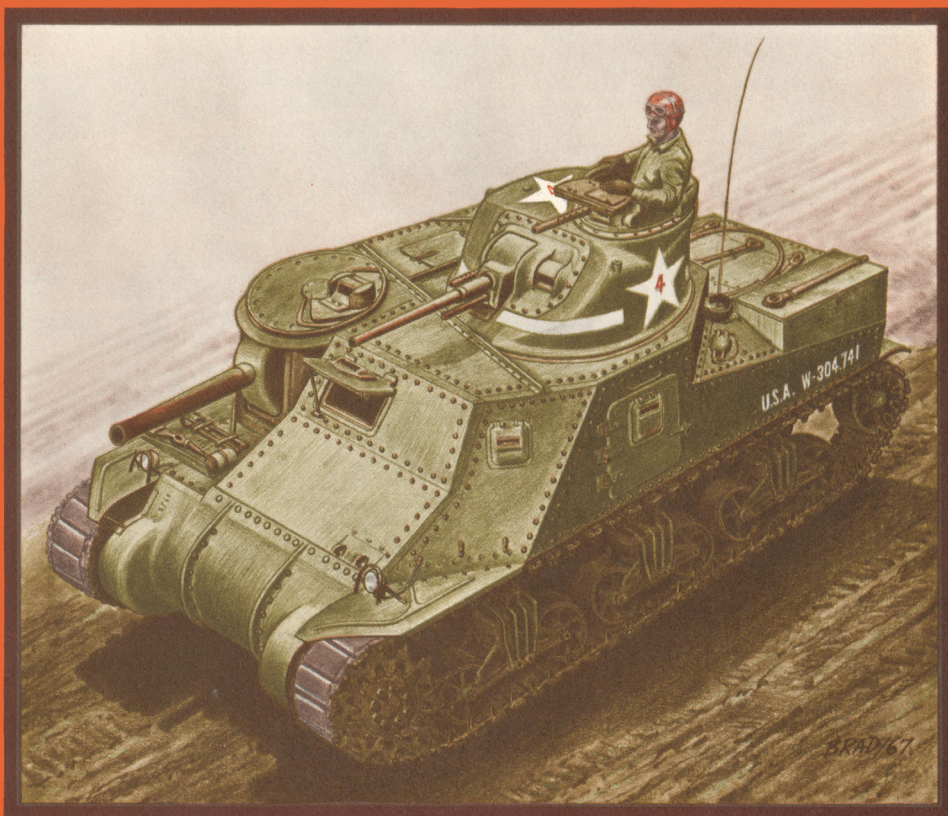


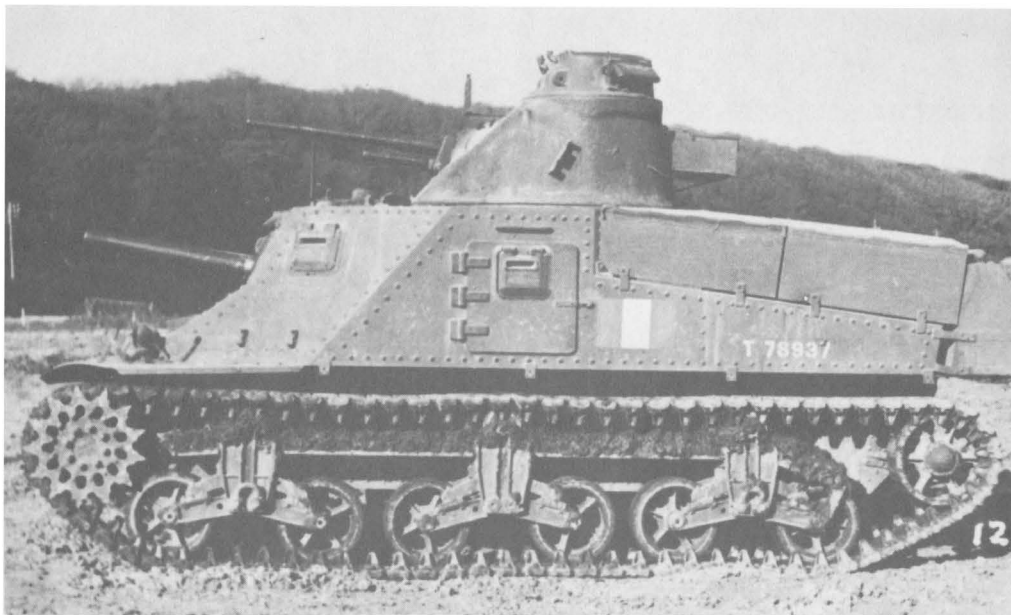


SERIES FIFTEEN

Medium Tank M.3 "GENERAL LEE"	
Mk.1.	(US)
Daimler Armoured Car Mk.1.	(UK)
T 82. 105mm Howitzer Motor Carriage	(US)
Panzerspahwagen 11 (2 cm KwK 38)	
"LUCHS" Sd. Kfz 123	(GE)



MILITARY VEHICLE PRINTS

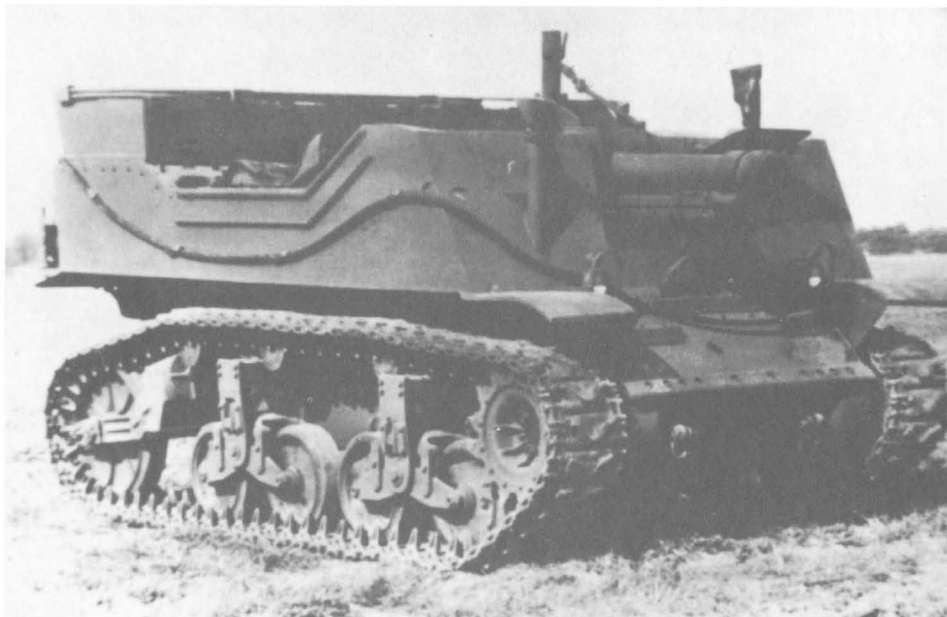


ABOVE: A 'General Lee' Mk I in British Service (T78937). It is interesting to compare this vehicle to that drawn. Note the additional stowage boxes and the form of mud chutes fixed between the suspension units. (Bellona Warpics Photo)

Cover Illustration - Drawn by George Bradford.

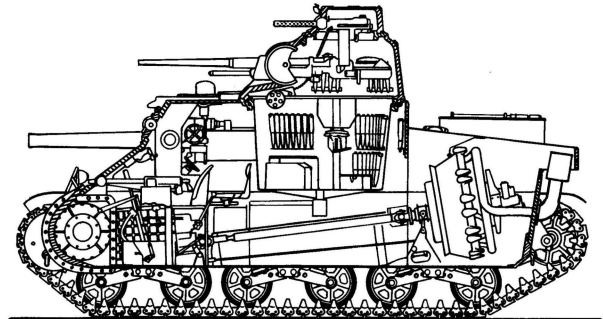
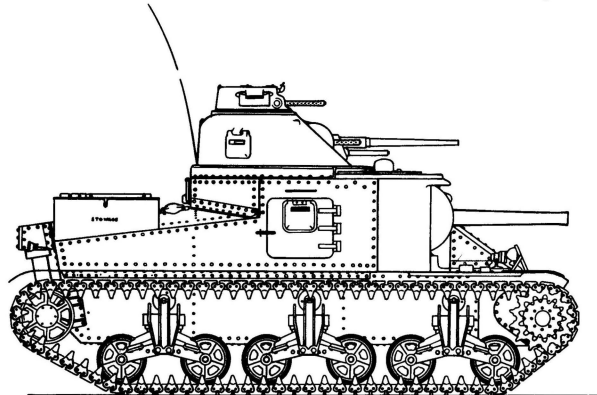
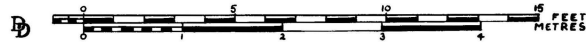
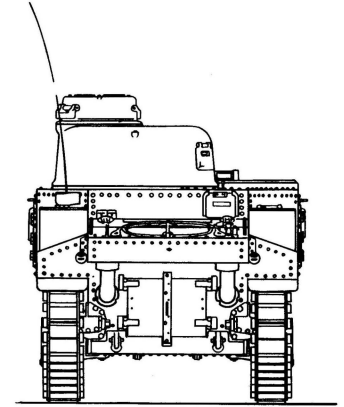
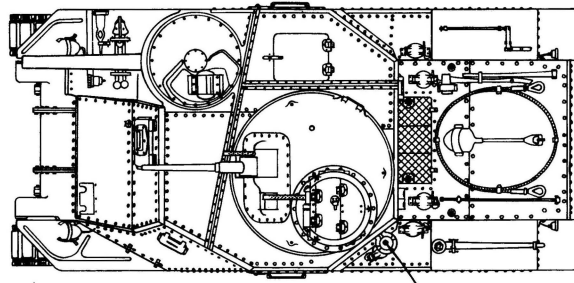
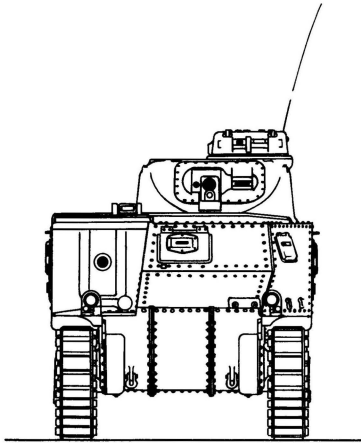
The General Lee first saw action with the British 7th Armoured Division at the battle of Gazala. The opposing force in this battle was the 15th Panzer Division. They continued to serve well until the first Shermans appeared for the Battle of El Alemain later that year. During the Desert Campaign the colour scheme was a basic sand with large diagonal patches of Grey. For the Allied invasion of Morocco in November 1942 they finished in Olive drab, as they were also when put into action against the Japanese in the South West Pacific. Though declared obsolete in 1944, they continued to serve with the British Army in Burma. Here the basic colour appears to have been sand - but additional colours were added to suit the particular terrain.

BELOW: The little known T 82 Howitzer vehicle based upon the Stuart light tank chassis. (Official US Photo)



MEDIUM TANK M3 GENERAL LEE Mk 1

SCALE 1:76 (4mm to 1foot) Drawn by D.P.DYER



MEDIUM TANK M.3 GENERAL LEE Mk.1 - 1941/42

The effective use of Tanks by the Germans brought home the necessity for the creation of an independent armoured force. On reviewing the situation it was decided that the majority of the 464 tanks available were inadequate for the new role, being armed in most instances with nothing more powerful than a .5 cal machine gun. Two new tanks had been evolved, both armed with the 37mm tank gun, these being the M2A4 Light tank which was in small scale production, and the M2AI Medium tank, pilots of which were being built.

Within a month of the formation of the Armoured Force it was decided that the 37mm armoured tank would be out of date before it was available in quantity. A requirement was therefore officially established for a medium tank to be armed with a 75mm gun and more heavily armoured than the M2AI Medium. In view of the development time that would be required for producing a tank with a gun of this calibre mounted in a 360 degrees traverse turret, it was decided to simplify matters by basing a design on the experimental T5E2 Medium Tank. This was the T.5 phase III Medium which the Ordnance Department had on its own initiative in 1938 converted to mount a 75mm Pack Howitzer in the hull to the right of the driver.

Contracts already placed for production of the M2AI Medium Tank were therefore altered to a vehicle that had yet to be drawn. A large number of parts were interchangeable so that the building of factories, and tooling of same was not allowed to be interrupted. The speed with which everything was done did not result in an ideal vehicle, but a 75mm gun tank was produced quickly and in quantity. By August 1942 the Chrysler Corporation had produced 3,243 of these tanks averaging over 50 per week. Other manufacturers produced a further 1681 during the same period not including production of the M3AI, M3A2, M3A3, M3A4 and M3A5 which were built in lesser quantities.

The "General Lee" as the Medium M.3 was named, was the tank supplied to Britain under Lease Lend. At a later date a British designed turret was incorporated which did not have a .30 cal m.g. cupola, and these were designated The "General Grant".

Early in 1942 M.3s were supplied to both the 3rd and 5th Royal Tank Regiments, and the 8th Hussars, each of which was equipped with two squadrons. These Regiments all belonged to the 4th Armoured Brigade of the British 7th Armoured Division. The first action recorded was on the 27th May 1942 when M.3s were used in trying to stem an encircling movement by the 15th Pz Div. at the battle of Gazala. In this action they were most successful in holding up the advance of the enemy for two days until three batteries of 'Eighty eights' were brought up to dislodge them. (Bellona Prints Series 9 No.36 GE)

The Medium M.3 nicknamed 'ELH' for Egypt's Last Hope came as a nasty shock for the Germans and Italians, and played a valuable part in reversing the fortunes of the Axis. The Americans used them during the invasion of French Morocco in November 1942, and about the same time against the Japanese in the Southwest Pacific. A number were supplied to Russia but the quantities and any actions they took part in are unknown. The Medium M.3 series of tanks were only ever classified as 'Limited Standard' by the Americans, and were declared obsolete in 1944.

During production, engineering changes were authorised at an alarming rate, but external modifications were relatively few. All M.3 Mediums had rivetted hulls and Wright or Continental 9 cylinder radial air cooled engines. The drawing shows a very early production model with side doors, M.2 75mm gun (L/31) and return rollers mounted centrally above suspension units. The Medium M.3 series were the first production tanks to have stabilisers fitted in elevation to the gun, for greater accuracy whilst firing on the move. When stabilisers were fitted to tanks armed with the M.2 gun, counterweights had to be clamped to the end of the gun barrels. Because of the increased length of M.3 guns (L/40) fitted to later models, they dispensed with counterweights. Side doors were not fitted to later models, and the pistol ports from these were retained on the gunners side only. Ventilation was improved early on by the addition of two ventilators on the fighting compartment roof, and one on top of the turret. A periscope fitted above the driver and trailing return rollers were added to final production models.

The M.3 Medium Tank chassis was used as the basis for the 105mm Howitzer Motor Carriage M.7, 155 Gun Motor Carriage M.12, Tank Recovery Vehicle M.31, Full Track Prime Mover M.33, Carrier Cargo T.14, and many were later converted to Canal Defence Light Vehicles, Armoured Recovery Vehicles, and Beach Armoured Recovery Vehicles.

Technical Specification

Crew: 6
Weight, Combat loaded: 62,200 lbs.
27.8 Long tons, 31.1 Short tons,
27.4 Tonnes.

Performance
Speed, Max. Road: 22 m.p.h. (35 Km.p.h.)
Max. Gradient: 31 degrees. (60%)
Fording depth: 3'4" (102 cm)
Trench crossing: 7'6" (229 cm)
Step: 2'0" (61 cm)
Min. Turning circle: 62'0" (19 metres)
Ground pressure: 13.2 lbs/sq.ins (.928 Kg/sq.cm)
Range (internal fuel), Road: 146 miles (235 Km)
Power to weight ratio: 14.4 HP/ton

Dimensions
Length overall: 18'6" (564 cm)
Length: 18'6" (564 cm)
Width overall: 8'11" (279 cm)
Height: 10'4" (315 cm)
Ground clearance: 1'5" (43 cm)
Fire height of gun: 5'10" (178 cm)
Turret ring dia: 5'0" (152 cm)
Road wheel dia (overall) 1'8" (51 cm)

Trackwork
Centres: 7'0" (213 cm)
Length on ground: 12'3" (373 cm)
Width: 1'4" (41 cm)
Pitch: 6" (15 cm)
Number of links per track: 79
Type: Dry Pin Double Pin Per Shoe, Rubber Block.

Mechanical Details.
Engine: Wright R-975-EC2 Radial 9 Cylinder, Petrol, 400 h.p. at 2,400 R.P.M. Air Cooled.
Transmission: Synchromesh, 5 forward, 1 reverse.
Steering: Controlled Differential.
Suspension: Vertical Volute Spring.

Armament

Main: 75mm/M2
Calibre, and length in calibres: 75mm (3 ins) L/31
(Later production M3 L/40)
Operation: Hand elevation and traverse.

Secondary armament:
1 x 37mm M.5 L/50 in 360 degrees traverse turret. Manual
and hydraulic traverse 4 x .30 cal. m.g.s. (1 cupola,
1 co-axial, 2 bow)

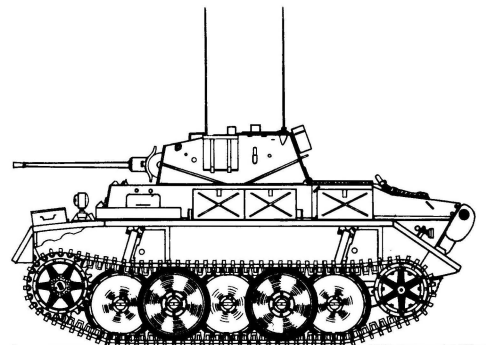
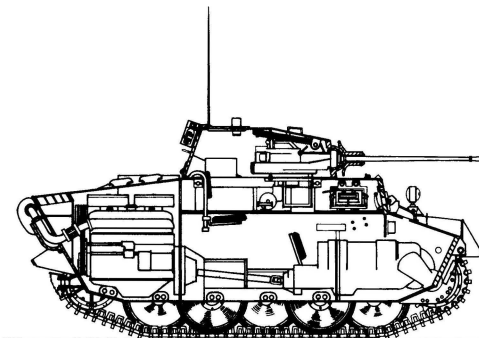
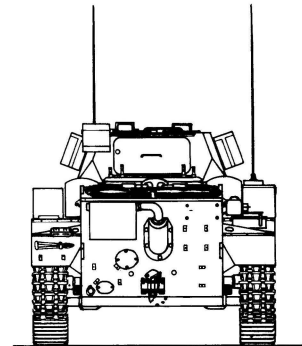
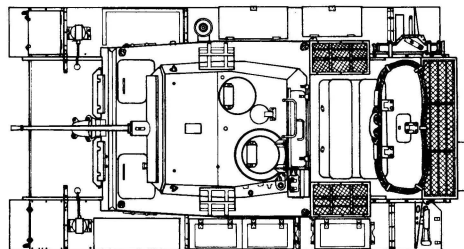
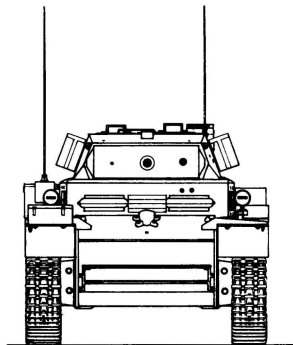
Stowage
Ammunition, main armament: 41 rds (75mm)
Ammunition, secondary armament: 179 rds. (37mm)
Ammunition, .30 cal. 8,000 rds.
Internal fuel capacity: 145 Imp. gals.
174 U.S. gals. 659 Litres.

Armour

Type: Rolled Plate, Cast Turret, Nose and Cupola
Hull, Nose upper: 2" (50 mm) at 0 to 54 degrees
Glass plate: 2" (50mm) at 54 degrees.
Drivers plate: 2" (50mm) at 30 degrees.
Sides, upper: 1½" (38mm) at 0 degrees.
lower: 1½" (38mm) at 0 degrees.
Rear, upper: 2" (50mm) at 0 degrees.
Lower: 1½" (13mm) at 90 degrees.
Engine covers: 1½" (13mm)
Belly, Front: 1" (25mm)
Rear: 1½" (13mm)

Turret
Front: 2" (50mm)
Sides: 2" (50mm)
Rear: 2" (50mm)
Roof: 1" (25mm) at 90 degrees.
Cupola: 2" (50mm)

Note: U.S. Angles 0 = Vertical, 90 = Horizontal.



PANZERSPÄHWAGEN II (2cm. KwK 38) 'LUCHS'

Panzerspawhagen II (2 cm KwK 38) 'Luchs' - Sd.Kfz 123. 1942/43.

As early as 1939, an attempt was being made to bring more flexibility to reconnaissance units by means of issuing a number of fully-tracked vehicles to them. To improve the situation further, an order was placed by the Ordnance Department on September 15, 1939, for the design of an armoured reconnaissance vehicle on a fully tracked chassis.

This order went to the Maschienfabrik Augsburg-Nuernberg AG. They in turn used the design features of their test vehicles VK 901 and VK 1601, which they combined together in a new test vehicle VK 1301. Both of these test vehicles based upon the Pz.Kpfw II concept incorporated such advanced features as wide tracks and the interleaving and overlapping road wheel arrangement successfully used on the Semi-tracked vehicles already in service. Springing was by transverse torsion bars. The VK 1601 was a heavily armoured vehicle intended to co-operate with the Infantry.

The final prototype model appeared as the VK 1303 in April 1942. This vehicle was finished in soft steel rather than armour plate. It incorporated many improvements over existing light armoured vehicles, the wide tracks and modern trackwork decreased ground pressure thus improving cross country mobility. The engine fitted had an output of 180 bhp which gave an excellent power to weight ratio. Six forward speeds were provided but in addition a two speed gearbox could be used, giving a total of 12 forward ratios - a range needed in the reconnaissance role.

The engine was similar to the HL 62 TR of the earlier Pz.Kpfw II series. The capacity was slightly increased, but the main increase in power came from the fitting of twin Solex downdraught Carburettors and in improving the manifold. This engine was also fitted in the ill-fated HK 900 series of semi-tracked vehicles described in M.ZgKw 8 ton write-up (Series 9. No. 35GE).

In addition to the normal vision blocks two 360 degree episcopes were fitted in the turret roof; one in the commanders hatch and the other for the gunner in the turret roof. Two radio sets for receiving and transmitting were carried. The crew consisted of four men; Commander, Gunner, Driver and Radio operator. The armament consisted of the 2cm KwK and an MG 34 mounted coaxially in the turret. The firing lever for the 2cm was incorporated into the elevating hand wheel. That of the MG 34 was built into the turret traversing wheel. Both weapons could be fired simultaneously or independently. The 2cm being fed by 10 round boxes and the MG 34 by 150 round belts.

Fully laden for battle the 'Luchs' (Lynx) weighed 11.8 tons. Top speed on roads was just short of 40 mph while speeds between 25 and 30 mph could be maintained over land. Maximum armour thickness was only 30 mm but this was adequate as it was supposed to rely upon its speed and manoeuvrability for defence. The first examples were issued to the troops in August of 1942 under the official designation 'Panzerspawhagen' II (2cm KwK 38) (Sd.Kfz 123). They were also known under the designation Pz.Kpfw II. Ausf L. 'Luchs'.

One vehicle captured and examined by British Intelligence units in 1944 had the chassis number 200164. This vehicle is still in existence at the Royal Armoured Corps Tank Museum, Bovington, Dorset, England.

The first 100 vehicles were armed with the 2cm KwK 38 and MG 34 but from the 101st they were re-armed with more powerful 5cm KwK 39 L/60 then in use in the PzKpfw III Ausf.M. However, only 31 such vehicles were produced before production was abandoned due to the changing requirements. This was in May 1943, originally it had been planned to provide nearly 800 Pz. Spawhagen 'Luchs'. Finally, it is interesting to note that while the chassis were built by MAN at Nuernberg, Daimler-Benz AG in Berlin-Marienfelde were responsible for the hull and turret. Little is known of their service history as so few were produced. A number served with Waffen SS units in the Normandy area in 1944.

Technical Specification

Crew: 4
Weight, Combat loaded: 26,432 lbs. 11.8 Long Tons, 13.4 Short tons,
11.98 Tonnes.

Performance

Speed, Max. Road: 37.28 m.p.h. (60 Km.p.h.)
Cross country: 26 m.p.h. (42 Km.p.h.)
Max. Gradient: 30 degrees. (59%)
Fording depth: 4'4" (132 cm)
Trench crossing: 5'7" (170 cm)
Step: 1'3 3/4" (40 cm)
Ground pressure: 10.66 lbs/sq.ins (0.75 Kg/sq.cm)
Range (internal fuel), Road: 155 Miles (257 Km)
Cross country: 93 Miles (155 Km)

Dimensions

Length: 15'2 1/2" (463 cm)
Width: 8'2" (249 cm)
Height: 6'11 1/2" (213 cm)
Ground clearance: 1'3" (38 cm)
Fire height of gun: 6'0" (183 cm)
Turret ring dia: 3'11 1/2" (122 cm)
Road wheel dia (Overall) 2'4 1/2" (73 cm)

Trackwork

Centres: 6'9 1/2" (207 cm)
Length on ground: 7'2 1/2" (220 cm)
Width: 1'2 1/2" (37.5 cm)
Pitch: 3 1/2" (9.5 cm)
Number of links per track: 95 Type: Steel dry single pin.

Mechanical Details

Engine: 1 x Maybach HL 66P, 6 Cylinder inline, Watercooled
Petrol engine of 6.75 litres developing 180 b.h.p. at 3,200 rpm.
Transmission: S.S.G. 48 gearbox with 6 forward and 1 reverse ratio;
plus a high/low subsidiary box
Steering: Epicycle Clutch and brake.
Suspension: Three single and two double roadwheels per side, each
sprung on single torsion bars.

Armament

Main: 1 x 2cm KwK 38.
Calibre, and length in calibres: 20 mm (0.78 ins), L/112.3
Traverse: 360 degrees. Operation: Hand.
Elevation: plus 18 degrees, minus 9 degrees.
Secondary armament: 1 x 7.92 MG 34 coaxial.
1 x 9 mm MP 38 or 41.

Stowage:

Ammunition, main armament: 330 rds.
Ammunition, secondary armament: 2,250 rds.
Internal Fuel capacity: 52 Imp. gals.
62 U.S. gal. 236 Litres.

Armour

Type: Rolled homogeneous plate, welded construction

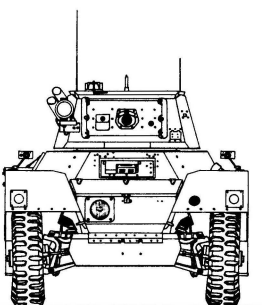
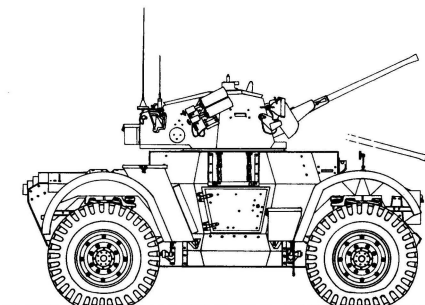
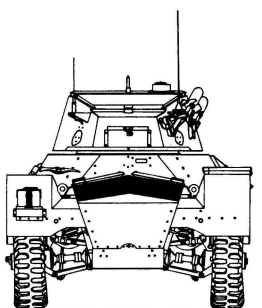
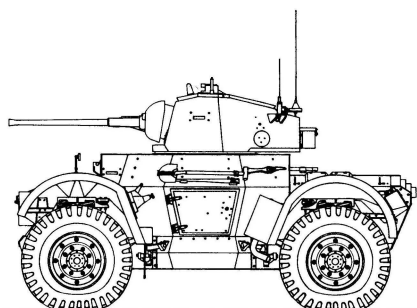
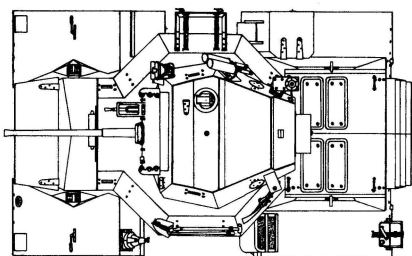
Hull, Nose upper: 1.18" (30 mm) at 68 degrees.
Nose lower: 0.78" (20 mm) at 18 degrees.
Glass plate: 0.78" (20 mm) at 16 degrees.
Drivers plate: 1.18" (30 mm) at 80 degrees.

Sides, 0.78" (20 mm) at 90 degrees.
Rear, 0.78" (20 mm) at 62 degrees.
Decking: 0.47" (12 mm) at 0 degrees.
Engine covers: 0.39" (10 mm) at 4 degrees.
Belly, 0.39" (10 mm) at 0 degrees.

Turret:

Front: 1.18" (30 mm) at 80 degrees.
Sides: 0.78" (20 mm) at 69 degrees.
Rear: 0.78" (20 mm) at 69 degrees.
Roof: 0.47" (12 mm) at 11 and 0 degrees.
Mantel: 1.18" (30 mm)

Note: German standard angles: 0 degrees = Horizontal
90 degrees = Vertical.



ARMOURD CAR, DAIMLER. Mark 1.

SCALE 1:76 (4mm. to 1 foot), Drawn by A.J.KAYE.

Armoured Car Daimler Mark I

It was during the early part of 1938 that discussions first took place between the War Mechanization Board and the Daimler Co, Ltd; with a view to designing a scout vehicle suitable for the most exacting conditions of war.

By June 1938 the design had been completed and production of the first prototype was begun. The Daimler Scout Car was fundamentally based upon the BSA Co. Scout design; "BSA tank, light, wheeled", the BSA Co. having been absorbed by Daimler about this time. By September 1938 the Scout Car had been tested and handed over to the Army for service evaluation.

Late in 1940 the War Office issued a specification to all British Motor Manufacturers for a new short wheelbase armoured car design with a turret mounted anti-tank as used in existing cruiser tanks. The Daimler proposal was a slight re-design of their Scout Car to take a 2 pdr. turret. It was automotively identical to the Scout Car, although facility for four wheel steering was cancelled before production started in 1941.

Since Daimlers Scout Car was in quantity production, and had proved very successful, their Armoured Car proposal was accepted. One other firm asked to produce an Armoured Car to this specification, was Humber (formerly Karrier).

Total production of Daimler armoured cars ran to 2,694 vehicles including the later Mark II and the few Daimler CS version fitted with a 3 inch Howitzer for close support duties. While only two major versions appeared there were many minor external variations - particularly on the Mark I. The vehicle drawn is a Mark I finished as it would appear on delivery to service units. In North Africa, immediate changes were made to include a spare wheel. The bracket on the right of the hull, which was originally intended to take sand channels apparently was never used for anything but a tarpaulin or makeshift angle iron container. The sand channels were usually mounted on brackets attached to front mudguards, so that they were positioned just below the stowage box. When a spare wheel was fitted; the jack was removed from the front wing and if stowage boxes were fitted over the spare wheel as was normal, the pick and shovel were removed to the rear plate. Racks for petrol cans were fitted to some vehicles on the right rear wing. Mark I's used in the invasion of Europe were more regular, being fitted out similarly to the Mark II. Spare wheel, new head and side lights, jack on rear right wing, fire extinguishers on both rear wings. Quite a number were fitted with radio aerials the same as Mark II and many also had 'Little John adaptors' fitted to their 2 pdrs to improve performance.

In action the Daimler proved most successful, after some initial teething troubles had been eliminated. In addition to reliability, speed and compact size, it's greatest asset was the ability to drive at full speed in both directions. The Commander took charge of a rear steering wheel and controls, but it was still up to the driver to change gear on instruction. The transmission was most interesting; drive was taken from engine to a five speed pre-selector gearbox. Provision of forward and reverse drive and also differential was achieved by the transfer box which accommodated the drive end of the vehicles four propeller shafts. Tactra constant velocity joints and epicyclic reduction gearing was provided at each hub along with 'disc' brakes.

The Daimler was also very popular with crews, and once issued, units were reluctant to give them up. In Italy during August 1944 the King's Dragoon Guards were allotted American Staghound cars to replace their ageing Daimlers - taken from 11th Hussars in November 1943 after 10 months service with that unit - they protested so strongly that they were allowed to keep the Daimlers which were re-engined and overhauled. These same cars were handed over to 23rd Armoured Brigade in May 1945 in good running condition.

Main users of Daimler Armoured Cars in Africa were the 11th Hussars, who received their cars in February 1943. The 12th Royal Lancers got theirs in March. Also there were the King's Dragoon Guards and 4th South African Armoured Car Regiment. Many other units were later equipped with Daimlers for use in Europe. In addition they were used successfully by the South East Asia Command. Daimler Armoured Cars were still in service with units of the Territorial Army in Britain until 1965.

The drawing shows the 11.00 x 20 tyres fitted only on Daimlers since the war. The drawing is based upon a vehicle on display in the Imperial War Museum, London. The war time type of tyre was a 10.50 x 20 size.

Grateful thanks are rendered to John Milson for his assistance in historical research on this vehicle.

Technical Specification for Armoured Car Daimler, Mk I.Crew: 3

Weight, Combat loaded: 16,800lbs.

7.5 Long tons, 8.4 Short tons, 7.620 Tonnes.

Performance

Speed, Max. Road: 50 m.p.h. (80.5 Km.p.h.)

Safe Static tilt: 50 degrees.

Fording depth: 1' 8" (50.6 cm)

Min. Turning circle. 42'0" (12.8 metres)

Range (internal fuel), Road: 252 Miles (406 Km)

Cross Country: 144 Miles (232 Km)

Power to weight ratio: Normal 13.35 HP/ton.

Dimensions

Length overall: 13'5" (409 cm)

Length: 13'0" (396 cm)

Width overall: 8'0" (244 cm)

Height to top of Periscope: 7'4" (223 cm)

Ground clearance: 1'4" (40.6 cm)

Fire height of gun: 6'2" (188 cm)

Wheels

Wheel Track: 6'6" F and R (198 cm)

Wheel Base: 8'6" (259 cm)

Rims: Dunlop M 205 6" x 20" 2 piece divided type.

Tyres: 10.50 x 20 R.F. (Run Flat) type.

Mechanical Details

Engine: 1 x Daimler 27 H.P. 6 cylinder water cooled petrol engine
4,095 cc Min BHP 95 at 3,600 rev/Min. Normal 100 B.H.P.
Cooling by Radiator, Fan and Pump.

Transmission: 5 forward and reverse ratios. Pre-selective self changing gear box and transfer box incorporating a differential and forward and reverse gears.

Steering; Main Box, David Brown, worm and Sector

Bevel Boxes, Straight tooth, bevel gear.

Suspension; Independent, wishbone links and coil springs

16" (40.6 cm) movement. Shock absorbers

Luvax piston type, Hydraulic

Brakes: Girling Discs hydraulically operated.

Rod and cable operated handbrake.

Armament.

Main: 1 x ordnance Q.F. 2 pdr. Mk II or IX A.

Calibre, and length in calibres: 40 mm (1.575 ins), L/50

Traverse: 360 degrees. Operation: Hand.

Elevation: plus 25 degrees, minus 15 degrees.

Secondary armament. 1 x 7.92 mm BESA M.G. (Coaxial)

1 x .303" Bren Gun.

1 x .45 Thompson Sub-Machine gun.

1 x 1" Vercy Signal Pistol.

2 x Discharger, Smoke Generator 4" No.3 Mkl

Stowage

Ammunition, main armament: 52 rds.

Ammunition, secondary armament: 2,700 rds. BESA (12 boxes)

500 rds. Bren (5 Magazines)

300 rds. Thompson (10 Magazines)

9 Grenades, 12 Signal Cartridges

Internal Fuel capacity: 2 x 18 Imp. gals.

2 x 21.6 U.S. gals. 2 x 81.77 Litres.

Armour

Type: Rolled steel Welded.

Hull: 14 mm Basis. (0.551")

Turret: 16 mm Basis (0.629")

Vision Arrangements.

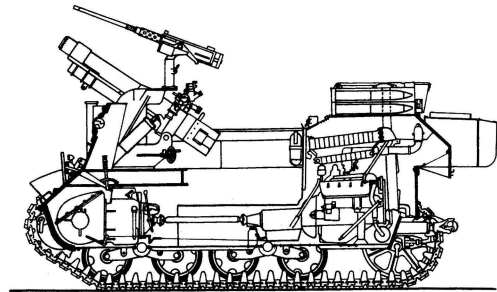
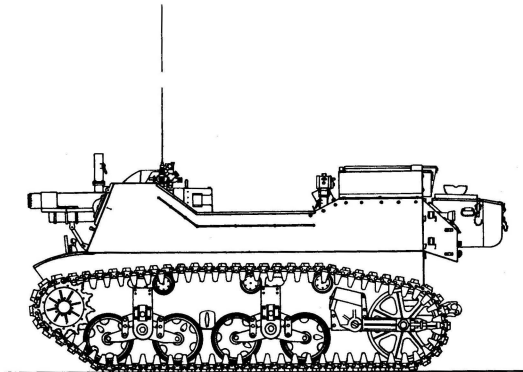
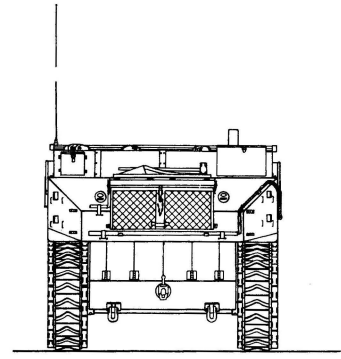
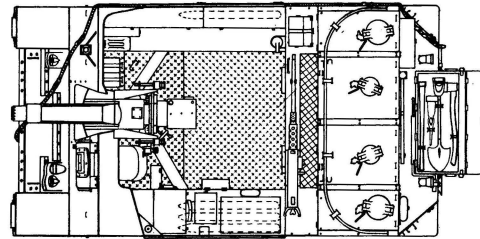
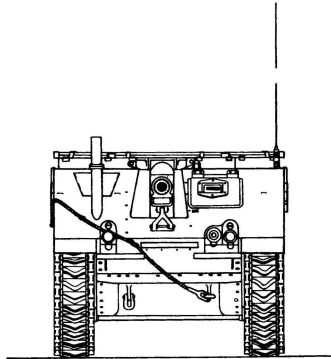
Commander: 1 x Periscope, Tank No.6, Mk.I

Gunner: 1 x Episcopo, Tank No.1, Mk.I

Communications.

1 x No.19, W/T. Set.

105MM HOWITZER MOTOR CARRIAGE T 82



105 mm Howitzer Motor Carriage T.82

Whilst the M.7 and M.7BI Self-propelled Howitzers were most useful vehicles, the medium tank chassis utilised were very extravagant for howitzers of this calibre. (Bellona Prints Series 3, No.9 US).

With the advent of the Pacific campaign in particular, the need was felt for a much lighter self-propelled 105mm howitzer. A project was therefore put in hand to develop a weapon of this type. The first prototype consisted of the conversion of a standard M.5 Light tank which had the turret removed and the fighting compartment, floor and frontal armour altered to accommodate a 105mm howitzer. Tests with this showed the feasibility of converting standard light tanks to 105mm Howitzer Motor Carriages.

From this feasibility project, two development models designated T.82 were built. These vehicles were manufactured, using light tank M5AI components wherever possible. The entire lower structure including engines, transmission, suspension being standard. The floor, driving controls and front plate being modified, and the width of the upper hull increased by 5½". Armament consisted of the 105mm Howitzer M.3 (Airborne) mounted on a modified M3AI gun mount to fire through an opening in the front armour. This gun having a traverse of 22 degrees right and 18 degrees left, and an elevation of minus 5 degrees to plus 35 degrees.

Tests with these vehicles showed them to be satisfactory for their intended purpose i.e. while retaining the performance of the light tank M5AI they provided a stable firing platform for the Howitzer. Attention was, however, drawn to the limited protection of the crew and part of the ammunition stowage, against small arms fire. It was also suggested that the .50 Cal m.g. pintle mount directly above the Howitzer was inconveniently located. Recommendations were that the design be considered satisfactory as a combat vehicle, and a limited number be produced for service board and combat testing. These recommendations were not implemented, however, before the war was over.

The M3 105mm Howitzer was the outcome of a development project instigated towards the end of 1941 for a 105mm Howitzer and could be easily transported by air. At that time the standard U.S. military transport plane was the C.47 Dakota which was a military version of the Douglas DC.3. The size of the doorways on these aircraft necessitated stripping the M.2AI 105mm Howitzers into five major components which had to be re-assembled after unloading. In order to overcome this disadvantage, experiments were carried out to reduce the overall dimensions of these guns. By shortening the gun barrel by 27" and mounting the gun itself on the carriage of the 75mm field Howitzer, it was found that in addition to making stripping unnecessary when entering the doorway of a Dakota, two Howitzers could be carried at one time. These Howitzers were standardised as the 105mm Howitzer M3 and carriage M3AI in March 1943.

Although firing the same shells as the M2AI Howitzer, a reduced charge was used, thereby reducing the maximum range. This disadvantage was more than balanced by the light weight of gun and carriage which was reduced to 2,500 lbs. This light weight for a 105mm Howitzer made the gun invaluable for amphibious operations, mountain warfare, and for use over soft jungle terrain as well as airborne operations.

As will be noted from the drawing, although standard 11½" track shoes were used, these were fitted with extended end connectors thereby increasing the effective width to 16" for improved flotation on soft ground. The four views show the .50 cal m.g. in its stowed position its pintle mount being shown fitted on the front support. In the sectional view the .50 cal m.g. is mounted on the pintle mount in its alternative position directly above the Howitzer. Stowage as shown is complete except for two spare track shoes and a track tensioning fixture which was mounted at each side of the chamfered corners of the rear hull. A camouflage net and waterproof covers for the vehicle which were stowed on top of the rear ammunition boxes, and four .30 cal carbines one of which was stowed on top of the right rear sponson ammunition box, and three on top of the battery box to the rear of the left hand sponson. These items have all been left off for clarity.

Grateful thanks are tendered to R.P. Hunnicutt Esq; for his research on the T.82.

Technical SpecificationCrew: 4

Weight, Combat loaded: 32,000 lbs. 14.3 long tons, 16 short tons,
14.1 Tonnes.

Performance:

Speed, Max. Road: 40 m.p.h. (64 Km.p.h.)

Max. Gradient: 30 degrees (60%)

Fording depth: 3'0" (91 cm)

Trench crossing: 5'6" (168 cm)

Step: 2'0" (61 cm)

Min. Turning Circle: 40'0" (12.2 metres)

Ground pressure: 8.3 lbs ½ sq. ins. (0.58 Kg/sq.cm)

Range (internal fuel) Road: 120 Miles (193 Km)

Power to weight ratio: (Net) 15.4 HP/ton

Dimensions

Length overall: to rear of Bustle Box 15'7½" (476 cm)

Width: 8'3" (251 cm)

Height: to top of .50 cal. clamped for travelling above Howitzer

8'9" (267 cm)

Ground clearance: 1'4½" (42 cm)

Fire height of gun: 5'8" (173 cm)

Road wheel dia (overall): 1'8" (51 cm)

Trackwork

Centres: 6'6" (198 cm)

Length on ground: 10'0" (285 cm)

Width: 1'4" (41 cm)

Pitch: 5½" (140 cm)

Number of links per track: 66

Type: Double Pin Rubber Bushed Outside Guide:

Mechanical Details

Engine: 2 x Cadillac V-8 petrol liquid cooled. Total net H.P.
220 at 3,400 r.p.m.

Transmission: Hydramatic 6 forward. 1 reverse.

Steering: controlled differential.

Suspension: Vertical Volute Spring.

Armament

Main: 1 x 105mm M3 HOW in modified mount M3AI.

Calibre and length in calibres: 105mm (4.14 ins) L/18.

Traverse: 22 degrees right, 18 degrees left. Operation: Hand.

Elevation: plus 35 degrees, minus 5 degrees.

Secondary Armament:

1 x .50 cal. m.g. H.B. M2.

4 x .30 cal carbines.

Stowage

Ammunition, main armament: 58 rds.

Ammunition, secondary armament: 500 rds. .50 cal. 500 rds. .30 cal

Internal fuel capacity: 72 Imp. gals. 86 U.S. gals. 325 Litres.

Armour

Type: Rolled Plate.

Hull, Nose upper: 1 1/8" (29mm) at 45 degrees.

Drivers plate: ½" (13mm) at 23 degrees.

Sides, upper: ¼" (6mm) at 0 degrees.

lower: 1 1/8" (29mm) at 0 degrees.

Rear, upper: ¼" (6mm) at 0 degrees.

Belly, front: 3/8" (10mm) at 90 degrees.

rear: ¼" (6mm) at 90 degrees.

Note: U.S. standard angles; 0 degrees = Vertical.

90 degrees = Horizontal.



ABOVE: The compact, though complex shape of the Daimler Mk I Armoured Car is clear from this photograph. Note the stowage box on the front plate and the position of the silencer. (Imperial War Museum Photo)

BELOW: The 'Luchs' was an extremely compact and useful reconnaissance tank. However, the war situation did not allow Germany to continue production of such luxuries. This particular vehicle was destroyed in the Falaise area after the Invasion of Europe in 1944. One of these vehicles is on display at the R.A.C. Tank Museum, Bovington Camp, Dorset, England. (Bellona Warpics Photo)



GERMAN DECORATIONS WORN BY PERSONNEL OF PANZER, PANZER GRENADIER AND ARMoured UNITS,
OR WITH SUPPORTING ARMS. 1936 - 1945 - PART II

By B.L. Davis. (For Part I See Bellona Prints Series 12)

THE INFANTRY ASSAULT BADGE (DAS INFANTERIESTURMABZEICHEN.)

Class in Silver Founded 20th December, 1939.

Awarded to Officers and Men of Infantry and Gebirgsjaeger Regiments who took a direct part in at least three first wave assaults on three different days fighting and had penetrated the enemy's lines with weapon in hand during these assaults. Worn on the lower left side of the left breast tunic pocket.

Class in Bronze. Founded on 1st June 1940.

Awarded to Members of Motorised Infantry Units.

Awarded for the same reasons as the Infantry Assault Badge in Silver.

Worn on tunic in the same position.

THE CLOSE COMBAT CLASP (DIE NAHKAMPFSPANGE)

Classes in Bronze, Silver and Gold

Founded on 25th November 1942 but back dated to 1st December 1939. Awarded to Infantry Personnel although it could be awarded to other branches of the Wehrmacht. Awarded for Single handed heroism in hand to hand fighting using only the rifle, pistol, grenade, bayonet or any other hand weapon.

Bronze Clasp for 15 days in a combat zone.

Silver Clasp awarded for 30 days in a combat zone.

Gold Clasp for 50 days in a combat zone.

Worn over the left breast tunic pocket above the medal ribbons.

THE GENERAL ASSAULT BADGE (Das ALLGEMEINESTURMABZEICHEN)

Classes in Silver and Bronze Founded on 1st June, 1940

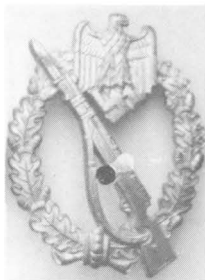
Awarded originally to Personnel of those branches of service that supported the Infantry and Panzer arms but who were not eligible to receive either Infantry Assault or Panzer Assault Badges. It was originally intended as an assault badge for Assault Engineers (Sturmpioniere) but was later awarded to personnel of other arms of service that had an auxiliary role in the assault of Infantry and Armoured formations. These included Artillery, Engineers, Medical and Anti-tank troops.

NUMBERED GENERAL ASSAULT BADGES. (DIE STUFEN ZUM ALLGEMEINESTURMABZEICHEN).

Classes 25, 50, 75, 100. Founded after July, 1943.

The general Assault Badge was slightly redesigned and the figures 25, 50, 75 and 100 were added to indicate the number of assault engagements in which the wearer had participated. At the same time as these higher grade awards were instituted members of Sturmgeschuetze, Sturmpanzer and Sfl. Panzer-Jaeger units became eligible for these awards.

Worn on the left breast tunic pocket.



ABOVE LEFT

Amongst his other decorations this Unteroffizier is wearing INFANTRY ASSAULT BADGE in Silver.



ABOVE RIGHT

This Panzerjaeger Oberleutnant wears the Silver GENERAL ASSAULT BADGE in addition to other decorations.